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PREPARATION AND PROPERTIES OF ACETOSTEARINS

Preparation:

The acetostearin products, which are true fats, are prepared by a relatively simple procedure. Monostearin and an amount of acetic anhydride ranging from 15% to 180% by weight of the monostearin used are allowed to react for one hour at about 230° F. Because the reactants form a homogeneous solution very little mixing or agitation is required. The reaction is stopped by adding water to the hot reaction mixture.

The term "monostearin" used above includes technical grade monoglycerides made from completely hydrogenated cottonseed oil as well as commercial grades of monostearin and pure monostearin.

The aforementioned reactions can all be carried out in a glass or stainless steel vessel, which may be open to the air or vented through a condenser.

When large batches of acetostearin products are being prepared, the reaction vessel must be provided with a cooling coil or other means of cooling the charge. The acetylation reaction is exothermic (generates heat), and the reaction between excess acetic anhydride and the water used to stop acetylation is also exothermic; therefore, violent boiling may occur if the temperature is not controlled.

After the acetylation reaction has been stopped by the addition of water, the crude reaction product is washed by stirring with batches of water, settling and decantation until it is free of acetic acid. The washed product is dried in any one of a number of ways; for example, heating the product under a partial vacuum and bubbling an inert gas through the product is satisfactory.

The washed and dried acetostearin product should possess only slightly more taste, odor, and color than did the original monostearin. If desired, the acetostearin product can be bleached with activated carbon or clay like any other fat, and it can be deodorized by the conventional procedure used for edible fats, except that a relatively low deodorization temperature (350-425° F.) must be employed. Carefully prepared and purified acetostearins should possess practically no color, taste, or odor.

The amount of acetic anhydride and the grade of monostearin used in the preparation influence the physical properties of the finished acetostearin product. Highly acetylated products prepared from monostearin containing 90% or more of monoglycerides tend to melt below body temperature (98.6° F.), and these products have a relatively low tenacity at room temperature. Products made from a technical grade monoglyceride derived from completely hydrogenated cottonseed oil (monoglyceride content, approximately 60%) and products made from monostearin acetylated to only a slight extent are relatively tenacious and may have melting points as high as 130° F.

To prepare acetostearin products melting over a short temperature interval (2-10° F.) it is necessary to use a monostearin product containing 90% or more of monoglycerides, which need not be composed entirely of esters of stearic acid. Commercial, molecularly distilled monostearin, which is a suitable starting material, is approximately a 1:1 mixture of monostearin and monopalmitin.

Properties:

All solidified acetostearin products are unique in that they are simultaneously nongreasy and quite plastic. At room temperature most products can be stretched several hundred percent before breaking. Paraffin wax having a melting point of 125° F. will stretch only 5% at room temperature when tested under similar conditions. Much of the ability of acetostearins to stretch is retained at freezing temperatures (20° F.). Other desirable characteristics of the acetostearin products include a short melting range, controllable melting point, and extreme resistance to rancidity or oxidation.

Potential Uses:

Acetostearins should find application as coatings for various products such as cheese, dressed meats, candy, and ice cream bars. They should prove useful in pharmaceutical and cosmetic products, as plasticizers in non-edible products, and wherever a low melting oil of high resistance to rancidity is desired.

Suitability for Food Use:

While preliminary tests have shown, as might have been expected, that the acetostearins are not toxic and do not exhibit abnormal physiological behavior on ingestion, they can not be recommended for food use until completion of all the tests which are underway.

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